

Atty. Docket No. 2003-0059-01
USSN 10/608,521

REMARKS

Claims 1-7 are pending in the application and Claims 1-7 are rejected. Applicants have amended Claims 1-7 in order to more particularly point out and claim their invention.

In the Specification

Applicants have amended the paragraph on page 8, lines 11-17 in order to remove the erroneous references to Figures 15 and 16, and properly refer to FIG. 6 as showing the results of the 5 Bp independent test on the Corning highly reflective mirror. Support for this amendment may be found, e.g., on page 3, lines 19-20 and in FIG. 6.

The 35 U.S.C. § 112 Rejections

Claims 1-7 stand rejected under 35 U.S.C §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-7 also stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Office Action states that the subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Applicants respectfully traverse these §112 rejections. The Specification of the above-captioned application describes the material used to make the highly reflective or anti-reflective multi-layer dielectric coatings that are of materials "selected to make the highly reflective mirror reflective within a certain relatively narrow band of wavelengths of light". Applicants submit that those of ordinary skill in the art, without undue experimentation can determine what such material is.

Further, the material is described as being subject to compaction/densification "upon exposure to DUV or shorter wavelength light". Applicants submit that those of ordinary skill in the art, without undue experimentation, can determine if such a reflectivity coating material is so subject to compaction/densification under such exposure.

Therefore, the materials to which the claims apply, while not listed specifically, have been adequately described. There are lists of reflectivity and anti-reflectivity coatings and

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specifically ones that are effective in DUV wavelengths, e.g., at around 193 nm. These, if not also disclosed to be subject to compaction/densification due to DUV exposure, can easily be determined by simple experiment to either be subject to or not be subject to such compaction/densification.

The fact that no specific example is disclosed does not make the Specification non-enabling so long as one skilled in the art can practice the invention without undue experimentation. See M.P.E.P §2164.02 citing *In re Borkowski*, 422 F.2d 904, 908, 164 U.S.P.Q. 642, 645 (C.C.P.A. 1970). Here, the invention is not the coating material, but rather, having selected a coating material that is subject to the recited compaction/densification, treating the coating in the claimed fashion in order to decrease the impact of DUV exposure when the optical element having the coating on it is further exposed to DUV light when in use in a laser system.

For much the same reasons, the Specification satisfies the written description requirement. The Specification describes the claimed subject matter, that is, the Specification describes an optical element with a coating that is subject to compaction/densification when exposed to DUV light, as claimed. It also describes a method of treating that optical element and its coating in the manner recited in the claims.

Therefore, the Examiner's rejections of the claims under U.S.C. §112, first paragraph, are unfounded, and the Examiner is respectfully requested to withdraw the rejection.

A telephone interview was conducted with the Examiner on December 12, 2007 and Kevin Roddy, Counsel for Applicants, which related to the following:

The amendment in the preamble would remove 112, first problems caused by "for reflecting electromagnetic radiation", and as discussed, the "wherein..." limitation added at the end of claim 1 (support noted on Specification page 9) would remove the rejection over Ruffner and probably the one over *Pan, et al.*, however, further review with respect to Belleville, et al., is needed, especially considering the most generic treatment claims and that the specific or even generic types of dielectric layers being treated cannot be determined by the Examiner from the claims or the Specification, as presently presented.

Further discussed clarifying the disclosed treatment process in the Specification by supplying information as to what dielectric materials are actually being treated in the exemplary

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disclosure, which at present, are only identified by trade names and marketing information, hence needs to be clarified in the record, preferably by supporting prior documents.

It was further noted that update of the prior art search would be required with respect to amendment and probable modification of the search once the Examiner can determine what multi-layer dielectric materials were actually treated or considered in the processes disclosed in the Specification, since at present, she does not know if her guesses as to the materials represented by the trade names were either close or correct, such that the search on what was actually intended may not be complete due to insufficient information, which can be supplied by identification of what the trade names, etc., represent.

The 35 U.S.C. 102(b) and 103(a) Rejections

Claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 5,911,858 to Ruffner (hereinafter, the '858 reference). Claim 1 also stands rejected under 35 U.S.C. 102 (b) or 102(e) as anticipated by, or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 6,180,188 to Belleville et al. (hereinafter, the '188 reference) or U.S. Patent No. 6,387,517 to Belleville et al. (hereinafter, the '517 reference). Claims 1-2 further stand rejected under 35 U.S.C. 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Publn. No. 2002/0001672 to Pan et al. (hereinafter, '672 reference). Claims 2 and 4 stand rejected under 35 U.S.C. 103(a) as being unpatentable over '858. Claims 1 and Claims 5-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over '188 or '517.

Applicants' Claim 1 relates to a method for stabilizing spectral shift in a multi-layered dielectric reflectivity coating located on a substrate for reflecting electromagnetic radiation after formation of the dielectric reflectivity coating on the substrate. The method comprises exposing the multi-layered dielectric reflectivity coating to a pretreatment of a sufficient amount of deep ultraviolet (DUV) laser radiation that is less than or equal to 300 nanometers in wavelength to induce sufficient compaction or densification by removal of water vapor in enough of the multi-layered dielectric reflectivity coating to inhibit subsequent compaction or densification during continued exposure to DUV or shorter wavelength radiation. Applicants have amended Claim 1 in order to clarify and particularly point out that the pretreatment is prior to use of the multi-layered dielectric coated substrate in one or more applications that expose the coating to optical

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fluence. Support for the amendment may be found, e.g., in Applicants' Specification on page 9, lines 11-23.

The '858 reference relates to a thin film deposition method to make reflective mirrors for deep ultraviolet light applications. Applicants submit that the '858 reference merely indicates that laser radiation from an ArF laser at 193nm is used to "[c]haracterize the ultimate reflectance of optimized multi-layered mirror..." Col. 17, lines 14-17. Applicants contend that nothing in the '858 reference teaches, suggests, or provides motivation for Applicants' claimed method of *stabilizing spectral shift* in a multi-layered dielectric reflectivity coating by exposing the coating to a pretreatment of a sufficient amount of DUV laser radiation *to induce sufficient compaction or densification by removal of water vapor* in enough of the multi-layered dielectric reflectivity coating to *inhibit subsequent compaction or densification* during continued exposure to DUV or shorter wavelength radiation. Applicants further contend that nothing that nothing in the '858 reference teaches or suggests having the pretreatment of multi-layered dielectric reflectivity coated substrate as prior to the use of the substrate in one or more applications that expose the coating to optical fluence.

The '858 reference only indicates that *lenses* made of particular materials used in DUV applications suffer from the problem of "absorption, which leads to optical compaction." See, e.g., col. 4, line 29 to col. 5, line 24. Applicants submit that the compaction described in the '858 reference is optical compaction, and is unrelated to compaction in Applicants' claimed invention, where water vapor is removed from a dielectric coating to promote compaction or densification of the coating layers. The optical compaction described in the '858 reference relates to changes in the chemical composition of the material. Applicants submit that the '858 reference is silent on compaction or densification of multi-layered mirrors by removal of water vapor, or how one of skill in the art would stabilize spectral shift of a multi-layered dielectric reflectivity coating. Accordingly, Applicants submit that the '858 reference does not disclose, suggest, or provide motivation for Applicants' claimed method, and that Claim 1 is in condition for allowance.

The '188 reference relates to preparing optic material by depositing inorganic polymeric material on a substrate. The '188 reference also indicates that the deposited layers are exposed to ultraviolet radiation to under a UV lamp to achieve "cross-linking/densification by exposure to ultraviolet rays." See, e.g., col. 14, lines 57-65. Applicants submit that the cross-linking

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indicated in the '188 reference is entirely unrelated to Applicants' claimed invention. The cross-linking method of the '188 reference uses ultraviolet light to promote bonding formation between the polymeric materials. The reference indicates that the treatment "permits cross-linking of the polymetric network, for example of the metal or metalloid oxyhydroxide of each layer and thus to densify this layer" and the treatment "gives rise in particular to improved mechanical resistance and an increase in the refractive index compared with an equivalent layer which has not undergone such treatment." Col. 7, lines 25-30. This cross-linking process also "ensures good interaction between the layers and improves the mechanical abrasion-resistance of the coating." Col. 7, lines 59-64. Similarly, the '517 reference relates to preparation and deposition of polymeric material, and promoting cross-linking and densification between the layers. See, e.g., col. 7, lines 31-56. Applicants submit that the promotion of cross-linking of layers in the '181 or '517 references do not show, suggest, or provide motivation for Applicants' claimed invention of stabilizing spectral shift in a multi-layered reflectivity coating on a substrate after formation of the coating by inducing compaction or densification *by removal of water vapor* to inhibit subsequent compaction or densification. The compaction or densification in Applicants' invention is related to the removal of water vapor, and has nothing to do with promotion of cross-linking between inorganic polymeric layers formed on a substrate. Furthermore, Applicants contend that the promotion of cross-linking of layers in the '181 or '517 references do not show or suggest having the pretreatment of multi-layered dielectric reflectivity coated substrate as prior to the use of the substrate in one or more applications that expose the coating to optical fluence. Accordingly, Applicants submit that the '181 and '517 references are silent on compaction or densification of multi-layered dielectric coatings by removal of water vapor, or how one of skill in the art would stabilize spectral shift of a multi-layered dielectric reflectivity coating. Moreover, the invention of Claim 1 is distinguishable from the '181 and '517 references, as the claimed pretreatment occurs prior to the use of the coated substrate in an application that exposes the coating to optical fluence.

The '672 reference relates to an overcoat protected diffraction grating, and promoting durability of the grating for performance in intense ultraviolet radiation. Applicants submit that the '672 reference indicates that the coatings to the grating are chosen to protect the grating surface from ultraviolet cause degradation and improve normal reflectivity from the reflecting

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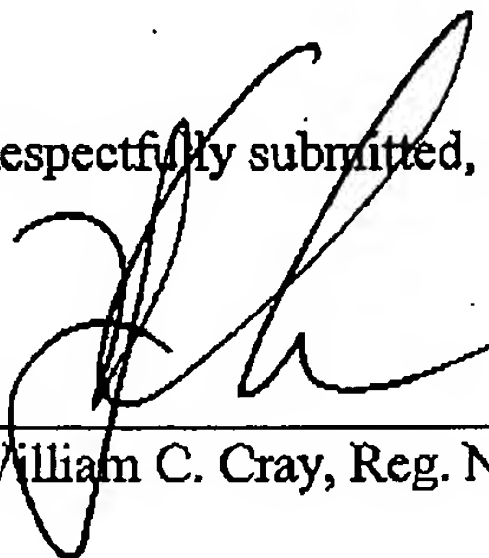
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grating faces. See, e.g., paragraph [0045]. Applicants acknowledge the features of the '672 reference but submit that Applicants' claimed invention improves upon the '672 reference by providing method for *stabilizing spectral shift* in a multi-layered dielectric reflectivity coating located on a substrate for reflecting electromagnetic radiation after formation of the dielectric reflectivity coating on the substrate. Applicants' method exposes the multi-layered dielectric reflectivity coating to a pretreatment of deep ultraviolet laser radiation to induce compaction or densification by removal of water vapor in enough of the multi-layered dielectric reflectivity coating to inhibit subsequent compaction or densification during continued exposure to DUV or shorter wavelength radiation.

For at least the above reasons, Applicants believe that Claim 1 is not shown or suggested by the prior art of record, and submit that Claim 1 is in condition for allowance. Applicants further submit that Claims 2-7, which depend from Claim 1, are also in condition for allowance for at least the same reasons as indicated above. Applicants respectfully request that the rejections under 35 U.S.C. 102 and 103 be accordingly withdrawn.

Applicants do not believe any fees are due at this time. However, if any other fees are due, the Commissioner is authorized to charge the appropriate amount to Deposit Account No. 03-4060.

Respectfully submitted,



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